

REMARKS

In the Office Action, the Examiner rejected the claims under 35 USC §112 and 35 USC §103. These rejections are fully traversed below. In addition, the claims have been amended to correct minor informalities and various typographical errors, and to further clarify the subject matter regarded as the invention. Claims 1-43 and 45-54 remain pending.

Reconsideration of the application is respectfully requested based on the following remarks.

CLAIM REJECTIONS UNDER 35 U.S.C. §112

Claims 1, 10, 19, 20, 28, and 37 were rejected under 35 USC §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses this assertion. The Examiner further states that “it is not clear where in the written description is an explicit description of simultaneously storing each of the plurality of entries of the outbound queue.” In view of the claims, as amended, none of the claims recite “simultaneously storing each of the plurality of entries of the outbound queue.” It is believed that the term “simultaneously” may have been misinterpreted, and has therefore been removed from the claim language. The meaning desired is that these items (e.g., a reference to a multiplicity of inbound queues) are present in the outbound queue at the same time (e.g., simultaneously). Applicant respectfully submits that the subject matter contained in these claims is present in Figure 3 and its corresponding text. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection to the claims under 35 USC §112.

CLAIM REJECTIONS UNDER 35 U.S.C. §103(a)

Claims 1-42 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,487,212 (Erimli) in view of U.S. Patent No. 5,392,401 (Barucchi). In addition, claims 43 and 45-54 are rejected under 35 U.S.C. §103(a) as being unpatentable over Erimli in view of Barucchi and further in view of U.S. Patent No. 5,177,480 (Clark).

As described in Applicant's specification, the traditional router has several potentially undesirable characteristics. First, an inbound port of a router typically has a single inbound queue associated therewith. Second, when a packet is forwarded, a single packet or entry in the inbound queue is transferred by an inbound controller to an outbound controller. Third, when the packet is received by the outbound controller, information associated with a single packet is stored in an entry in an outbound queue.

Each of the independent claims provides at least one of the following advantages or limitations over the prior art. First, a plurality of inbound queues is provided for a single inbound port. An inbound packet is therefore classified in one of the plurality of inbound queues to enable the inbound packet to be stored in the appropriate queue. Second, one of the plurality of inbound queues is transferred to an outbound controller and/or outbound queue capable of storing (or identifying) a multiplicity of inbound queues. In other words, a queue of packets rather than a single packet is transferred to the outbound controller and/or an associated outbound queue such that a reference (e.g., pointer) to the queue of packets is stored in a single entry in the outbound queue. In other words, a reference to each of the multiplicity of inbound queues is stored in a different entry in the outbound queue. Third, in some embodiments of the invention, it is possible to encrypt an inbound queue prior to transmission by an outbound controller. One or more of the above-described limitations are present in each of the claims.

For instance, independent claim 1 recites a method for providing an inbound controller for a router having an inbound port and an outbound port. More specifically, claim 1 recites, in relevant part, providing a plurality of inbound queues for an inbound port...classifying the inbound packet in a selected one of the plurality of inbound queues according to packet sorting criteria, storing the inbound packet in the selected one of the plurality of inbound queues, and determining when one of the plurality of inbound queues is ready to be moved to an outbound queue capable of storing a reference to a multiplicity of inbound queues such that a reference to each of the multiplicity of inbound queues is separately stored in a different one of a plurality of entries in the outbound queue, each of the multiplicity of inbound queues storing a plurality of packets that are to be separately transmitted (as separate messages).

Erimli discloses a queueing structure and method for prioritization of frames in a network switch. See Title. A multiport switch enables communication of data packets between network stations. See Col. 4, lines 21-24. The switch has a number of ports, each of which as a receive first in-first out (FIFO) buffer and transmit FIFO. See col. 6, lines 1-16. Data packets are received and stored in the corresponding receive FIFO. See col. 6, lines 10-16. The frame pointer and associated information is placed into the appropriate output queue of the transmit

port. See col. 22, lines 37-54. Specifically, the port vector FIFO places the frame pointer into the top of the appropriate output queue. See col. 8, lines 16-22. The output queues provide temporary storage for frame pointers when they are queued for transmission. Queueing takes the form of the port vector FIFO writing frame pointers into the various output queues. See col. 10, lines 46-56. Thus, the port output queues hold entries for frames to be forwarded to the 100 Mb/s ports. See col. 11, lines 20-23. A frame pointer points to the memory location in the external memory where the frame is stored. See col. 8, lines 1-3. While Erimli discloses that the output queue structure is not limited to frame pointers as entries (see col. 9, lines 28-37), Erimli neither discloses nor suggests queueing queues (or queue pointers) as entries.

Erimli neither discloses nor suggests an outbound queue that is capable of storing or otherwise identifying a plurality of inbound queues. Rather, as the Examiner indicates, Erimli discloses a prior art outbound queue that stores a plurality of packets, rather than storing or otherwise identifying a plurality of inbound queues. [It is important to note that a queue is a data structure that is used to store a plurality of packets.] Similarly, Erimli neither discloses nor suggests transferring one of the plurality of inbound queues (storing a plurality of packets) to such an outbound queue (or an entry in an outbound queue), and therefore neither discloses nor suggests determining when one of a plurality of inbound queues is ready to be moved to an outbound queue. Rather, as described above, Erimli merely discloses enqueueing a single frame and therefore a single entry in the inbound queue onto an outbound queue, and therefore teaches away from transferring or enqueueing an entire queue of packets in an outbound queue. In addition, Erimli neither discloses nor suggests providing a plurality of inbound queues for an inbound port and classifying a packet in one of the plurality of inbound queues. In fact, a single inbound queue and transmit queue is disclosed for each port, as described above. See col. 6, lines 1-16. Barucchi fails to cure the deficiencies of the primary reference. As such, combining the cited references would fail to achieve the desired result.

Erimli does disclose the handling of frames stored in an inbound queue. However, it is important to note that a frame is transmitted between network points as a unit complete with addressing and necessary protocol control information (similarly to a packet), and are therefore separately transmittable. Erimli neither discloses nor suggests transferring a queue of packets to an entry in an outbound queue. Rather, Erimli discloses transferring individual frame pointers to the outbound queue, as described above. Thus, a single frame or single entry from the inbound queue is enqueued in (i.e., transferred to) a single entry in an outbound queue, rather than enqueueing the entire inbound queue storing a plurality of packets which are separately transmittable in an entry in an outbound queue. In other words, the cited art teaches that a single

transmittable message (e.g., frame) is transferred to an outbound queue at a time (to an entry in the outbound queue), rather than transferring a plurality of separately transmittable messages (e.g., frames) at a time (to an entry in the outbound queue). Stated another way, the presently claimed invention transfers more than one separately transmittable message (e.g., packet) to an entry in the outbound queue, and is therefore superior to the prior art, which transfers only one separately transmittable message (e.g., frame) to an entry in an outbound queue. The Examiner admits that frames are sent separately to the outbound queue. Thus, it is clear that in Erimli it is frames that are separately stored in entries in the outbound message queue, rather than an entire inbound queue (e.g., plurality of separately transmissible messages) that is transferred and stored in an entry in the outbound queue. As such, Erimli teaches away from the claimed invention. Barucchi fails to cure the deficiencies of the primary invention. Accordingly, Applicant respectfully traverses the Examiner's assertion.

None of the references, separately or in combination, disclose or suggest the problems present in the prior art or the solutions presented by the presently claimed invention. Based on the foregoing, it is submitted that the independent claims are patentable over the cited references. In addition, it is submitted that the dependent claims are also patentable for at least the same reasons. For instance, dependent claim 2 recites asserting an interrupt when it is determined that one of the plurality of inbound queues is ready to be moved to an outbound queue. Similarly, claim 45, which depends from claim 2, recites transferring the one of the plurality of inbound queues to the outbound queue or an outbound controller associated with the outbound queue when the interrupt is asserted. In other words, an inbound queue may be transferred to an outbound queue or an outbound controller by a CPU, as recited in claim 46. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above discussed limitations are clearly sufficient to distinguish the claimed invention from the cited references. Thus, it is respectfully requested that the Examiner withdraw the rejection of the claims under 35 USC §103(a).

In view of the above, Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

If any fees are due in connection with the filing of this amendment, the Commissioner is authorized to charge such fees to Deposit Account 50-0388 (Order No. CISCP054). A duplicate copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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